From: Coltrain, Katrina
Sent: Friday, July 29, 2016 2:59 PM
To: Perez, Myra; Warren, Christy; Flores, Raymond
Cc: Luis Vega (lvega@eaest.com); Patrick Appel (pappel@eaest.com)
Subject: Wilcox Oil Company - Lab Request Forms Updated
Attachments: Lab sample tables 7-29-16.pdf; Primary COPCs for Wilcox 7-27-16.xlsx; WILCOX RI Sept 12-2016 Sample Request Form 7-29-16.doc; WILCOX RI Sept 19-2016 Sample Request Form 7-29-16.doc

All, please find attached the Lab Request Forms for Wilcox Oil. As discussed, we will be in the field the weeks of September 12 and September 19. In addition, we have confirmed that additional funding for the project will not be forthcoming in time for us to complete all actions we planned; therefore, the number of samples being requested for soil has been significantly reduced.

Also, you will notice that the plan is to use the pre-weighted vials/stir bar for sampling the VOCs in soil (rather than the core samplers as mention on the conference call). Because of the nature of the sampling, some of them may be medium soil but we are not certain that is the case. Can we indicate on the Chain-of-custody the samples we think will be medium and if the lab finds that the samples may be low, rerun the sample without dilution as a low concentration sample?

Thank you for your time and patience as we worked through these issues. I hope that these forms provide you with a better understanding of what we need for the RI. Please call with any questions.

thanks

Katrina Higgins-Coltrain
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SCREENING CRITERIA FOR GROUND WATER AND CLP REFERENCE LIMITS: Primary Compounds for Wilcox 7-27-16

Analyte	Analytical Method	CASRN	Units	Project Screening Level(4)	CRQLs(5)		
					Low Water by SIM	Trace Water	Low Water
Volatile Organic Compounds							
1,1,2-Trichloroethane	SOM02.3	79-00-5	µg/L	5	--	0.50	5
1,2-Dibromo-3-chloropropane	SOM02.3	96-12-8	µg/L	0.2	--	0.50	5
1,2-Dibromoethane (EDB)	SOM02.3	106-93-4	µg/L	0.05	--	0.50	5
2-Butanone (Methyl Ethyl Ketone)	SOM02.3	78-93-3	µg/L	5,600	--	5	10
Acetone	SOM02.3	67-64-1	µg/L	14,000	--	5	10
Benzene	SOM02.3	71-43-2	µg/L	5	--	0.50	5
Chloroform(6)	SOM02.3	67-66-3	µg/L	80	--	0.50	5
Ethylbenzene	SOM02.3	100-41-4	µg/L	700	--	0.50	5
Isopropylbenzene (Cumene)	SOM02.3	98-82-8	µg/L	450	--	0.50	5
Methylcyclohexane	SOM02.3	108-87-2	µg/L	13000	--	0.50	5
Methylene Chloride	SOM02.3	75-09-2	µg/L	5	--	0.50	5
Toluene	SOM02.3	108-88-3	µg/L	1,000	--	0.50	5
m,p-Xylene	SOM02.3	179601-	µg/L	10,000	--	0.50	5
o-Xylene	SOM02.3	95-47-6	µg/L	190	--	0.50	5
Semivolatile Organic Compounds							
1,1'-Biphenyl	SOM02.3	92-52-4	µg/L	0.83	--	--	5
1,4-Dioxane	SOM02.3	123-91-1	µg/L	0.46	--	--	2
2,4-Dimethylphenol	SOM02.3	105-67-9	µg/L	360	--	--	5
2,4-Dinitrophenol	SOM02.3	51-28-5	µg/L	39	--	--	10
2,4-Dinitrotoluene	SOM02.3	121-14-2	µg/L	0.24	--	--	5
2,6-Dinitrotoluene	SOM02.3	606-20-2	µg/L	0.049	--	--	5
2-Methylnaphthalene	SOM02.3	91-57-6	µg/L	36	0.1	--	5
2-Methylphenol	SOM02.3	95-48-7	µg/L	930	--	--	10
3,3'-Dichlorobenzidine	SOM02.3	91-94-1	µg/L	0.13	--	--	5
4,6-Dinitro-2-methylphenol	SOM02.3	534-52-1	µg/L	1.5	--	--	10
4-Methylphenol	SOM02.3	106-44-5	µg/L	1,900	--	--	10
Acenaphthene	SOM02.3	83-32-9	µg/L	530	0.1	--	5
Dibenzofuran	SOM02.3	132-64-9	µg/L	7.9	--	--	5
Naphthalene	SOM02.3	91-20-3	µg/L	0.17	--	--	5
Phenanthrene	SOM02.3	85-01-8	µg/L	120	0.1	--	5
Phenol	SOM02.3	108-95-2	µg/L	5,800	NS	--	10
Pyrene	SOM02.3	129-00-0	µg/L	120	0.1	--	5
Polycyclic Aromatic Hydrocarbons							
Anthracene	SOM02.3	120-12-7	µg/L	1,800	0.1	--	5
Benzo(a)anthracene	SOM02.3	56-55-3	µg/L	0.012	0.1	--	5
Benzo(a)pyrene	SOM02.3	50-32-8	µg/L	0.2	0.1	--	5
Benzo(b)fluoranthene	SOM02.3	205-99-2	µg/L	0.034	0.1	--	5
Benzo(g,h,i)perylene	SOM02.3	191-24-2	µg/L	120.00	0.1	--	5
Benzo(k)fluoranthene	SOM02.3	207-08-9	µg/L	0.34	0.1	--	5
Chrysene	SOM02.3	218-01-9	µg/L	3.4	0.1	--	5
Dibenz(a,h)anthracene	SOM02.3	53-70-3	µg/L	0.0034	0.1	--	5
Fluoranthene	SOM02.3	206-44-0	µg/L	800	0.1	--	10
Fluorene	SOM02.3	86-73-7	µg/L	290	0.1	--	5
Indeno(1,2,3-cd)pyrene	SOM02.3	193-39-5	µg/L	0.034	0.1	--	5
Naphthalene	SOM02.3	91-20-3	µg/L	0.17	0.1	--	5
Phenanthrene	SOM02.3	85-01-8	µg/L	120.00	0.1	--	5
Pyrene	SOM02.3	129-00-0	µg/L	120	0.1	--	5
2-Methylnaphthalene	SOM02.3	91-57-6	µg/L	36	0.1	--	5
ICP-MS Metals (7)							
Aluminum	ISM02.3	7429-90-	µg/L	20000	--	--	20
Antimony	ISM02.3	7440-36-	µg/L	6	--	--	2
Arsenic	ISM02.3	7440-38-	µg/L	10	--	--	1
Beryllium	ISM02.3	7440-41-	µg/L	4	--	--	1
Cadmium	ISM02.3	7440-43-	µg/L	20	--	--	1
Chromium	ISM02.3	7440-47-	µg/L	100	--	--	2
Cobalt	ISM02.3	7440-48-	µg/L	6	--	--	1
Iron	ISM02.3	7439-89-	µg/L	14,000	--	--	200
Lead	ISM02.3	7439-92-	µg/L	15	--	--	1
Manganese	ISM02.3	7439-96-	µg/L	430	--	--	1
Nickel	ISM02.3	7440-02-	µg/L	390	--	--	1
Selenium	ISM02.3	7782-49-	µg/L	50	--	--	5
Silver	ISM02.3	7440-22-	µg/L	50	--	--	1
Thallium	ISM02.3	7440-28-	µg/L	2	--	--	1
Vanadium	ISM02.3	7440-62-	µg/L	86	--	--	5
Miscellaneous							
Cyanide	ISM02.3	57-12-5	µg/L	200	--	--	10
Hexavalent Chromium (EPA Region 6 Lab)	EPA 218.6	18540-29-9	µg/L	0.035	--	--	--
Mercury	ISM02.3	7439-97-	µg/L	2	--	--	0.2

NOTES:

1. U.S. Environmental Protection Agency (EPA) National Primary Drinking Water Regulations, Maximum Contaminant Levels (MCLs), May 2009.
2. EPA Region 6 Regional Screening Levels (RSLs) for Tapwater (May 2016) for hazard index = 1.0 for non-carcinogens and a 10-6 cancer risk level for carcinogens.
3. Oklahoma Water Resources Board (OWRB) Interim Water Quality Standards (WQSs) (https://www.owrb.ok.gov/quality/standards/standards.php) (OWRB 2013)
4. The project screening level was selected to satisfy EPA requirements. The EPA MCL will be used; if no EPA MCL standard exists for an analyte, then the project screening level is the lower of the EPA Tapwater RSL or OWRB Interim WQS, if achievable.
5. Contract-required Quantitation Limits (CRQLs) for EPA Contract Laboratory Program (CLP)
6. EPA RSL for tapwater is for total trihalomethanes.
7. EPA MCL and tapwater RSL apply to total metals.

µg/L = Microgram(s) per liter ICPMS = Inductively-coupled plasma and mass spectrometry mg/L = Milligram(s) per liter NS = Not specified

-- = Not provided PCB = Polychlorinated biphenyl c =

SCREENING CRITERIA FOR AIR AND CLP REFERENCE LIMITS: Primary Compounds for Wilcox 7-27-16

Analyte	Analytical Method (1)	Units	CASRN	Project Screening Level (4)	Achievable	
					DL	RL
Volatile Organic Compounds (VOCs), including Naphthalene						
Acetone	TO-15 SIM/TO-15	µg/m3	67-64-1	32,000	0.109	1.188
Benzene	TO-15 SIM/TO-15	µg/m3	71-43-2	0.36	0.249	0.31947
Bromodichloromethane	TO-15 SIM/TO-15	µg/m3	75-27-4	0.076	0.121	0.670
2-Butanone (Methyl Ethyl Ketone)	TO-15 SIM/TO-15	µg/m3	78-93-3	5,200	0.147	1.180
Carbon Tetrachloride	TO-15 SIM/TO-15	µg/m3	56-23-5	0.47	0.069	0.6292
Chloroform	TO-15 SIM/TO-15	µg/m3	67-66-3	0.12	0.054	0.4883
Chloromethane	TO-15 SIM/TO-15	µg/m3	74-87-3	94	0.114	1.032
3-Chloropropene	TO-15 SIM/TO-15	µg/m3	107-05-1	0.47	0.213	1.565
alpha-Chlorotoluene	TO-15 SIM/TO-15	µg/m3	100-44-7	0.057	0.072	0.518
Cumene	TO-15 SIM/TO-15	µg/m3	98-82-8	420	0.059	0.492
Cyclohexane	TO-15 SIM/TO-15	µg/m3	110-82-7	6,300	0.072	0.344
1,2-Dichlorobenzene	TO-15 SIM/TO-15	µg/m3	95-50-1	210	0.144	0.601
1,3-Dichlorobenzene	TO-15 SIM/TO-15	µg/m3	541-73-1	NS	0.114	0.601
cis-1,2-Dichloroethene	TO-15 SIM/TO-15	µg/m3	156-59-2	NS	0.107	0.39648
1,1-Dichloroethane	TO-15 SIM/TO-15	µg/m3	75-34-3	1.8	0.077	0.40479
1,1-Dichloroethene	TO-15 SIM/TO-15	µg/m3	75-35-4	210	0.091	0.39652
1,2-Dibromoethane (EDB)	TO-15 SIM/TO-15	µg/m3	106-93-4	0.0047	0.115	0.76843
1,4-Dichlorobenzene	TO-15 SIM/TO-15	µg/m3	106-46-7	0.26	0.084	0.60127
trans-1,2-Dichloroethene	TO-15 SIM/TO-15	µg/m3	156-60-5	NS	0.075	0.39648
1,2-Dichloropropane	TO-15 SIM/TO-15	µg/m3	78-87-5	0.28	0.055	0.462
cis-1,3-Dichloropropene	TO-15 SIM/TO-15	µg/m3	10061-01-5	NS	0.077	0.454
1,4-Dioxane	TO-15 SIM/TO-15	µg/m3	123-91-1	0.56	0.133	0.360
Ethyl Benzene	TO-15 SIM/TO-15	µg/m3	100-41-4	1.1	0.096	0.43419
4-Ethyltoluene	TO-15 SIM/TO-15	µg/m3	622-96-8	NS	0.088	0.492
Hexachlorobutadiene	TO-15 SIM/TO-15	µg/m3	87-68-3	0.13	0.469	5.333
Naphthalene	TO-15 SIM/TO-15	µg/m3	91-20-3	0.83	NS	NS
1,1,2,2-Tetrachloroethane	TO-15 SIM/TO-15	µg/m3	79-34-5	0.048	0.124	0.68654
Toluene	TO-15 SIM/TO-15	µg/m3	108-88-3	5,200	0.064	0.37681
Trichloroethene	TO-15 SIM/TO-15	µg/m3	79-01-6	0.48	0.107	0.53738
1,2,4-Trimethylbenzene	TO-15 SIM/TO-15	µg/m3	95-63-6	7.3	0.034	0.492
m,p-Xylene	TO-15 SIM/TO-15	µg/m3	108-38-3	100	0.056	0.43423
o-Xylene	TO-15 SIM/TO-15	µg/m3	95-47-6	100	0.069	0.43423
Vinyl Chloride	TO-15 SIM/TO-15	µg/m3	75-01-4	0.17	0.023	0.255

NOTES:

1. Analytical laboratory will screen the sample to determine if sample will be analyzed via TO-15 SIM (low level) or TO-15.
2. U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) Summary Table May 2016 http://www.epa.gov/region9/superfund/prg/.
3. Values calculated based on EPA current residential air RSLs (updated May 2016) modified using the methodology specified in the *EPA OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Source to Indoor Air* , June 2015 by dividing by an attenuation factor of 1 for crawlspace soil gas and 0.03 for sub-slab soil gas.
4. The project screening level was selected to satisfy the EPA requirements asspecified in the *EPA OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Source to Indoor Air.*
5. Achievable laboratory limits are for Eurofins Air Toxics, Inc., Folsom, California; limits determined for Quarter 3 of 2015. CASRN = Chemical Abstracts Service Registry Number

c/nc = Carcinogen/non-carcinogen
NA = Not applicable
NS = Not specified
RL = Reporting limit
µg/m3= Microgram(s) per cubic meter
TO-15 = *EPA Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air* , Second Edition.

SCREENING CRITERIA FOR SOIL AND CLP REFERENCE LIMITS: Primary Compounds for Wilcox 7-27-16

Analyte	Analytical Method	CASRN	Units	Project Screening Level(5)	CRQL (6) Low Soil by	Low Soil	Medium Soil
Volatile Organic Compounds (VOCs)							
1,1,2,2-Tetrachloroethane	SOM02.3	79-34-5	mg/kg	0.127	--	0.005	0.25
1,2-Dibromo-3-chloropropane	SOM02.3	96-12-8	mg/kg	0.0053	--	0.005	0.25
1,2-Dibromoethane (EDB)	SOM02.3	106-93-4	mg/kg	0.036	--	0.005	0.25
1,2-Dichlorobenzene	SOM02.3	95-50-1	mg/kg	0.01	--	0.005	0.25
1,2-Dichloroethane	SOM02.3	107-06-2	mg/kg	0.02	--	0.005	0.25
1,2-Dichloropropane	SOM02.3	78-87-5	mg/kg	0.002	--	0.005	0.25
2-Butanone (Methyl ethyl ketone	SOM02.3	78-93-3	mg/kg	35	--	0.01	0.5
Acetone	SOM02.3	67-64-1	mg/kg	2.5	--	0.01	0.5
Benzene	SOM02.3	71-43-2	mg/kg	0.01	--	0.005	0.25
Bromodichloromethane	SOM02.3	75-27-4	mg/kg	0.29	--	0.005	0.25
Carbon Tetrachloride	SOM02.3	56-23-5	mg/kg	0.4	--	0.005	0.25
Chloroform	SOM02.3	67-66-3	mg/kg	0.001	--	0.005	0.25
Cyclohexane	SOM02.3	110-82-7	mg/kg	6,500	--	0.005	0.25
Ethylbenzene	SOM02.3	100-41-4	mg/kg	0.03	--	0.005	0.25
Isopropylbenzene (Cumene)	SOM02.3	98-82-8	mg/kg	1,900	--	0.005	0.25
Methylcyclohexane	SOM02.3	108-87-2	mg/kg	6500	--	0.005	0.25
Tetrachloroethene	SOM02.3	127-18-4	mg/kg	0.002	--	0.005	0.25
Toluene	SOM02.3	108-88-3	mg/kg	0.01	--	0.005	0.25
Trichloroethene	SOM02.3	79-01-6	mg/kg	0.001	--	0.005	0.25
Vinyl Chloride	SOM02.3	75-01-4	mg/kg	0.01	--	0.005	0.25
m,p-Xylene	SOM02.3	179601-23-1	mg/kg	580	--	0.005	0.25
o-Xylene	SOM02.3	95-47-6	mg/kg	0.1	--	0.005	0.25
Semivolatile Organic Compounds (SVOCs)							
1,1'-Biphenyl	SOM02.3	92-52-4	mg/kg	47	--	0.17	5
1,4-Dioxane	SOM02.3	123-91-1	mg/kg	2.05	--	0.067	2
2,2'-Oxybis (1-chloropropane	SOM02.3	108-60-1	mg/kg	19.9	--	0.33	10
2,4-Dimethylphenol	SOM02.3	105-67-9	mg/kg	0.01	--	0.17	5
2,4-Dinitrotoluene	SOM02.3	121-14-2	mg/kg	1.28	--	0.17	5
2,6-Dinitrotoluene	SOM02.3	606-20-2	mg/kg	0.033	--	0.17	5
2-Methylnaphthalene	SOM02.3	91-57-6	mg/kg	3.24	0.0033	0.17	5
2-Methylphenol	SOM02.3	95-48-7	mg/kg	0.5	--	0.33	10
3,3'-Dichlorobenzidine	SOM02.3	91-94-1	mg/kg	0.646	--	0.33	10
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol)	SOM02.3	534-52-1	mg/kg	0.144	--	0.33	10
4-Chloroaniline	SOM02.3	106-47-8	mg/kg	0.03	--	0.33	10
4-Chlorophenyl-phenylether	SOM02.3	7005-72-3	mg/kg	NS	--	0.17	5
4-Methylphenol	SOM02.3	106-44-5	mg/kg	0.05	--	0.33	10
Anthracene	SOM02.3	120-12-7	mg/kg	0.1	0.0033	0.17	5
Atrazine	SOM02.3	1912-24-9	mg/kg	0.00005	--	0.33	10
Benzo(a)anthracene	SOM02.3	56-55-3	mg/kg	0.16	0.0033	0.17	5
Benzo(a)pyrene	SOM02.3	50-32-8	mg/kg	0.016	0.0033	0.17	5
Benzo(b)fluoranthene	SOM02.3	205-99-2	mg/kg	0.16	0.0033	0.17	5
Benzo(g,h,i)perylene	SOM02.3	191-24-2	mg/kg	1.1	0.0033	0.17	5
Benzo(k)fluoranthene	SOM02.3	207-08-9	mg/kg	1.1	0.0033	0.17	5
Chrysene	SOM02.3	218-01-9	mg/kg	1.1	0.0033	0.17	5
Dibenz(a,h)anthracene	SOM02.3	53-70-3	mg/kg	0.016	0.0033	0.17	5
Dibenzofuran	SOM02.3	132-64-9	mg/kg	73	--	0.17	5
Fluoranthene	SOM02.3	206-44-0	mg/kg	0.1	0.0033	0.33	10
Fluorene	SOM02.3	86-73-7	mg/kg	29	0.0033	0.17	5
Hexachlorobenzene	SOM02.3	118-74-1	mg/kg	0.0025	--	0.17	5
Hexachlorobutadiene	SOM02.3	87-68-3	mg/kg	0.04	--	0.17	5
Hexachlorocyclopentadiene	SOM02.3	77-47-4	mg/kg	0.755	--	0.33	10
Hexachloroethane	SOM02.3	67-72-1	mg/kg	0.596	--	0.17	--
Indeno(1,2,3-cd)pyrene	SOM02.3	193-39-5	mg/kg	0.16	0.0033	0.17	5
Naphthalene	SOM02.3	91-20-3	mg/kg	0.099	0.0033	0.17	5
Phenanthrene	SOM02.3	85-01-8	mg/kg	0.1	0.0033	0.17	5
Phenol	SOM02.3	108-95-2	mg/kg	0.05	--	0.33	10
Pyrene	SOM02.3	129-00-0	mg/kg	0.1	0.0033	0.17	5
Organochlorine Pesticides							
Aldrin	SOM02.3	309-00-2	mg/kg	0.00006	--	0.0017	--
Alpha BHC	SOM02.3	319-84-6	mg/kg	0.0025	--	0.0017	--
Beta BHC	SOM02.3	319-85-7	mg/kg	0.001	--	0.0017	--
Dieldrin	SOM02.3	60-57-1	mg/kg	0.0005	--	0.0033	--
Endrin	SOM02.3	72-20-8	mg/kg	0.00004	--	0.0033	--
Gamma BHC - Lindane	SOM02.3	58-89-9	mg/kg	0.00005	--	0.0017	--
Toxaphene	SOM02.3	8001-35-2	mg/kg	0.119	--	0.17	--
p,p-DDT	SOM02.3	50-29-3	mg/kg	0.0035	--	0.0033	--
Polychlorinated Biphenyls (PCBs)							
Aroclor-1254	SOM02.3	11097-69-1	mg/kg	0.24	--	0.033	--
Aroclor-1260	SOM02.3	11096-82-5	mg/kg	0.24	--	0.033	--
Aroclor-1262	SOM02.3	37324-23-5	mg/kg	0.24	--	0.033	--
Aroclor-1268	SOM02.3	11100-14-4	mg/kg	0.24	--	0.033	--
TAL Metals ICP-MS							
Antimony	ISM02.3	7440-36-0	mg/kg	0.14	--	1	--
Arsenic	ISM02.3	7440-38-2	mg/kg	0.68	--	0.5	--
Barium	ISM02.3	7440-39-3	mg/kg	1	--	5	--
Cadmium	ISM02.3	7440-43-9	mg/kg	0.0022	--	0.5	--
Chromium	ISM02.3	7440-47-3	mg/kg	0.4	--	1	--
Cobalt	ISM02.3	7440-48-4	mg/kg	0.14	--	0.5	--
Lead	ISM02.3	7439-92-1	mg/kg	0.054	--	0.5	--
Selenium	ISM02.3	7782-49-2	mg/kg	0.028	--	2.5	--
Thallium	ISM02.3	7440-28-0	mg/kg	0.057	--	0.5	--
Vanadium	ISM02.3	7440-62-2	mg/kg	1.6	--	2.5	--
Miscellaneous							
Cyanide	ISM02.3	57-12-5	mg/kg	2.7	--	0.5	--
2,3,7,8-TCDD (TEQ)	CLP HRSM01.2	1746-01-6	mg/kg	0.0000048	--	--	0.000001
Mercury	ISM02.3	7439-97-6	mg/kg	0.1	--	0.1	--

NOTES:

1. U.S. Environmental Protection Agency (EPA) Regional Screening Levels (RSLs) for residential and industrial use scenario for hazard index = 1.0 for non-carcinogens and a 10-6 cancer risk level for carcinogens (May 2016).
2. Ecological screening levels for soil are only applicable to surface or shallow subsurface soil.
3. The lowest ecological risk soil screening value from the Risk Assessment Information System (RAIS) database, found at http://rais.ornl.gov/tools/eco_search.php.
4. EPA Ecological Soil Screening Levels. http://www.epa.gov/ecotox/ecossl/.
5. Oklahoma Department of Environmental Quality (ODEQ). 2012. *Risk-Based Levels for Total Petroleum Hydrocarbons (TPH)* . Land Protection Division. October. https://www.deq.state.ok.us/lpdnew/VCPIndex.htm
6. The project screening level was selected to satisfy the requirements of the EPA as the (1) the residential EPA RSL and (2) the lowest ecological risk soil screening value from the RAIS. For analytes with no SSL or RSL, the project screening level will be NS (not specified).
7. Achievable laboratory limits are for Eurofins Lancaster Laboratories Environmental, LLC., Lancaster, Pennsylvania. mg/kg = Milligram(s) per kilogram

c = Carcinogenic
CASRN = Chemical Abstracts Service Registry Number
DL = Detection limit
Eco-SSL = Ecological Screening Level
NS = Not specified
RL = Reporting limit
SW = EPA SW-846 Test Methods for Evaluating Solid Waste, Third Edition

TABLE 6. PROPOSED FIELD PROGRAM FOR SOIL INVESTIGATION

Sample Location	Sample Medium	Rationale	Number of Sample Locations	Sample Identification	Sampling Tool	Sampling Depth (ft bgs)	Analysis: Field Screening by PID	VOCs (includes EDB)	PAHs (SIM)	SVOCs	TAL Metals (includes Mercury)	Cyanide	Hexavalent Chromium	Pesticides	PCBs	Dioxins/ Furans
Lorraine Process Area																
Lorraine Process Area (LPA)	Surface soil	To assess potential source areas and delineate nature and extent	26	LPA-SB-01-0.5 through LPA-SB-26-0.5	Split spoon Continuous sampler PVC/acetate sleeve	0.0 - 0.5	Yes	26	26	26	26	26	0	0	0	0
			26	LPA-SB-01-2.0 through LPA-SB-26-2.0		0.5 - 2.0	Yes	26	26	26	26	26	0	0	0	0
	Subsurface soil		26	LPA-SB-01-6.0 through WPA-SB-26-6.0		2.0 -6.0	Yes	26	26	26	26	26	0	0	0	0
			26	LPA-SB-01-10.0 through LPA-SB-26-10.0		6.0 - 10.0	Yes	26	26	26	26	26	0	0	0	0
			26	LPA-SB-01-?? through LPA-SB-26-??		2 ft interval above refusal	Yes	26	26	26	26	26	0	0	0	0
Lorraine Process Area (LPA) Cooling Pond	Surface soil	To determine if cooling pond is a source area	4	LPA-SB-27-0.5 through LPA-SB-30-0.5	Split spoon Continuous sampler PVC/acetate sleeve	0.0 - 0.5	Yes	4	4	4	4	4	4	0	0	0
			4	LPA-SB-27-2.0 through LPA-SB-30-2.0		0.5 - 2.0	Yes	4	4	4	4	4	0	0	0	0
	Subsurface soil		4	LPA-SB-27-6.0 through WPA-SB-30-6.0		2.0 -6.0	Yes	4	4	4	4	4	0	0	0	0
			4	LPA-SB-27-10.0 through LPA-SB-30-10.0		6.0 - 10.0	Yes	4	4	4	4	4	0	0	0	0
			4	LPA-SB-27-?? through LPA-SB-30-??		2 ft interval above refusal	Yes	4	4	4	4	4	0	0	0	0
Wilcox Process Area																
Wilcox Process Area (WPA)	Surface soil	To assess potential source areas and delineate nature and extent	65	WPA-SB-01-0.5 through WPA-SB-65-0.5	Split spoon Continuous sampler PVC/acetate sleeve	0.0 - 0.5	Yes	65	65	65	65	65	Total 10 samples: 7 Randomly Selected Borings + WPA-SB-01-0.5 WPA-SB-01-0.5 WPA-SB-19-0.5	10	10	10
			65	WPA-SB-01-2.0 through WPA-SB-65-2.0		0.5 - 2.0	Yes	65	65	65	65	65	0	0	0	0
	Subsurface soil		65	WPA-SB-01 -6.0 through WPA-SB-65-6.0		2.0 -6.0	Yes	65	65	65	65	65	0	0	0	0
			65	WPA-SB-01 -10.0 through WPA-SB-65-10.0		6.0 - 10.0	Yes	65	65	65	65	65	0	0	0	0
			65	WPA-SB-01-?? through WPA-SB-65-??		2 ft interval above refusal	Yes	65	65	65	65	65	0	0	0	0
East Tank Farm Area																
East Tank Farm (ETF)	Surface soil	To assess potential source areas and delineate nature and extent	11	ETF-SB-01-0.5 through ETF-SB-11-0.5	Split spoon Continuous sampler PVC/acetate sleeve	0.0 - 0.5	Yes	11	11	11	11	11	0	0	0	0
			11	ETF-SB-01-2.0 through ETF-SB-11-2.0		0.5 - 2.0	Yes	11	11	11	11	11	0	0	0	0
	Subsurface soil		11	ETF-SB-01-6.0 through ETF-SB-11-6.0		2.0 -6.0	Yes	11	11	11	11	11	0	0	0	0
			11	ETF-SB-01-10.0 through ETF-SB-11-10.0		6.0 - 10.0	Yes	11	11	11	11	11	0	0	0	0
			11	ETF-SB-01-?? through ETF-SB-11-??		2 ft interval above refusal	Yes	11	11	11	11	11	0	0	0	0
East Tank Farm (ETF) Tanks 1 and 4	Surface soil	To determine if this is a source area	10	ETF-SB-12-0.5 through ETF-SB-21-0.5	Split spoon Continuous sampler PVC/acetate sleeve	0.0 - 0.5	Yes	10	10	10	10	10	0	0	0	0
	Surface soil		10	ETF-SB-12-2.0 through ETF-SB-21-2.0		0.5 - 2.0	Yes	10	10	10	10	10	0	0	0	0
Total Soil Samples								**550**	**550**	**550**	**550**	**550**	**14**	**10**	**10**	**10**
Soil Investigation QC																
Field Duplicates	Soil		1 per 10 samples					55	55	55	55	55	2	1	1	1
MS/MSDs	Soil		1 per 20 samples (extra volume only; not included in total sample count)					28	28	28	28	28	1	1	1	1
Total Soil Samples Associated with Soil Investigation								**633**	**633**	**633**	**633**	**633**	**17**	**12**	**12**	**12**
Water QC Samples																
Trip blanks	Water		1 per cooler containing equipment rinsate for equipment used in soil investigation					15	0	0	0	0	0	0	0	0
Equipment blanks	Water		1 per day per set of for nondedicated equipment per team					30	30	30	30	30	1	1	1	1
Total Water QC Samples Associated with Soil Investigation								**45**	**30**	**30**	**30**	**30**	**1**	**1**	**1**	**1**

TABLE 6. PROPOSED FIELD PROGRAM FOR SOIL INVESTIGATION

Sample Location	Sample Medium	Rationale	Number of Sample Locations	Sample Identification	Sampling Tool	Sampling Depth (ft bgs)	Analysis									
							Field Screening by PID	VOCs (includes EDB)	PAHs (SIM)	SVOCs	TAL Metals (includes Mercury)	Cyanide	Hexavalent Chromium	Pesticides	PCBs	Dioxins/ Furans
Background																
Background grid	Surface soil	Background	1	BKG-0.5	ICS Methodology Hand auger Slide hammer Scoop	0.0 - 0.5	Yes	0	1	0	1	0	0	0	0	1
Total Background Soil Samples								**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**1**
Background Soil QC																
Field Replicates	Soil		1 Duplicate (BKG-0.5-D) and 1 Triplicate (BKG-0.5-T)					0	2	0	2	0	0	0	0	2
MS/MSDs	Soil		1 per 20 samples (extra volume only; not included in total sample count)					0	1	0	1	0	0	0	0	1
Total Soil Samples Associated with Background								**0**	**3**	**0**	**3**	**0**	**0**	**0**	**0**	**3**
Water QC Samples																
Trip blanks	Water		1 per cooler containing equipment rinsate for equipment used in soil investigation					0	0	0	0	0	0	0	0	0
Equipment blanks	Water		1 per day per set of for nondedicated equipment per team					0	1	0	1	0	0	0	0	1
Total Water QC Samples Associated with Background Soil								**0**	**1**	**0**	**1**	**0**	**0**	**0**	**0**	**1**

NOTES:
Sample depth will vary depending upon location of sample and depth of refusal; as a result, the number of samples collected may be less than shown.

bgs = Below ground surface
EDB = Ethylene dibromide
ft = foot (feet)
ICS = Incremental Composite Sampling
MS = Matrix spike
MSD = Matrix spike duplicate
NORM = Naturally-occurring radioactive materials
PAH = Polycyclic aromatic hydrocarbon
PCB = Polychlorinated biphenyl
PID = Photoionization detector
PVC = polyvinyl chloride
QC = Quality control
SIM = Selective ion monitoring
SVOC = Semivolatile organic compound
TAL = Target Analyte List
TPH = Total petroleum hydrocarbons
VOC = Volatile organic compound

TABLE 8. PROPOSED FIELD PROGRAM FOR PRIVATE SUPPLY WELL AND PIEZOMETER SAMPLING

Sample Location	Sample Identification	Sampling Method	Analyses										
			Field Parameters	LNAPL Characterization	VOCs (includes EDB)	PAHs (SIM)	SVOCs	TAL Metals (includes Mercury)	Cyanide	Hexavalent Chromium	Pesticides	PCBs	Dioxins/ Furans
East Tank Farm Residential Wells	GW-01	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-02	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-03	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-04	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
North of East Tank Farm Residential Wells	GW-05	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-06	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-07	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
South of East Tank Farm Residential Wells	GW-08	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-09	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
Lorraine Process Area Church Well	GW-10	Tap or Grab	1	1	1	1	1	1	1	1	0	0	0
North Tank Farm Residential Well	GW-11	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
North of North Tank Farm Residential Well	GW-12	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
Wilcox Residential Well	GW-13	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
East Tank Farm Private Wells Not In Use	GW-14	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-15	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
Total Investigation Tap Samples			**15**	**1**	**15**	**15**	**15**	**15**	**15**	**15**	**0**	**0**	**0**
Field duplicate	1 per 10 samples		0	0	2	2	2	2	2	2	0	0	0
MS/MSDs	1 per 20 samples (extra volume only; not included in total sample count)		0	0	1	1	1	1	1	1	0	0	0
Total Private Supply Well Samples			**15**	**1**	**17**	**17**	**17**	**17**	**17**	**17**	**0**	**0**	**0**
Water QC Samples													
Trip blanks	1 per cooler containing aqueous samples for VOC analysis		0	0	1	0	0	0	0	0	0	0	0
Equipment blanks	1 per day per set of for nondedicated equipment per team		0	0	0	0	0	0	0	0	0	0	0
Total Water QC Samples Associated with Private Supply Well Sampling			**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Piezometers													
Piezometers	PW-01 through PW-10	Low Flow	10	0	10	10	10	10	10	1	0	0	0
Total Investigation Tap Samples			**10**	**0**	**10**	**10**	**10**	**10**	**10**	**1**	**0**	**0**	**0**
Field duplicate	1 per 10 samples		0	0	1	1	1	1	1	1	0	0	0
MS/MSDs	1 per 20 samples (extra volume only; not included in total sample count)		0	0	1	1	1	1	1	1	0	0	0
Total Piezometer Samples			**10**	**0**	**11**	**11**	**11**	**11**	**11**	**2**	**0**	**0**	**0**
Water QC Samples													
Trip blanks	1 per cooler containing aqueous samples for VOC analysis		0	0	1	0	0	0	0	0	0	0	0
Equipment blanks	1 per day per set of nondedicated equipment per team		0	0	1	1	1	1	1	1	0	0	0
Total Water QC Samples Associated with Piezometer Sampling			**0**	**0**	**2**	**1**	**1**	**1**	**1**	**1**	**0**	**0**	**0**

NOTES:
Field parameters: pH, temperature, conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity

bgs = Below ground surface
EDB = Ethylene dibromide
MS = Matrix spike
MSD = Matrix spike duplicate
PAH = Polycyclic aromatic hydrocarbon
PCB = Polychlorinated biphenyl
QC = Quality control
SIM = Selective ion monitoring
VOC = Volatile organic compound

TABLE 9. PROPOSED FIELD PROGRAM FOR VAPOR INTRUSION INVESTIGATION

Sample Type	Proposed Sample Area	Matrix	Sample Method	Sample Frequency	Sample Interval	Sample Identification	No. of Sample Locations	TO-15 SIM /TO-15
Vapor Instrusion Samples								
Indoor Air/ Sub-Slab or Crawlspace	Lorraine Process Area (LPA) Church	Air/Soil Gas	TO-15: 6-Liter Summa canister with 24-hour regulator	1 sub-slab or crawlspace 1 indoor per location (sampled once in winter and once in summer)	Sub-slab taken below slab Crawlspace taken in crawlspace Indoor air sample collected from within breathing zone (3 to 4 feet above ground surface) of the home	For sub-slab or crawl space air sample: LPA-SS-01 or LPA-CS-01 For indoor air sample: LPA-IA-01	2	2
	Lorraine Process Area Residence					For sub-slab or crawl space air sample: LPA-SS-02 or LPA-CS-02 For indoor air sample: LPA-IA-02	2	2
	Wilcox Process Area (WPA) Residence					For sub-slab or crawl space air sample: WPA-SS-03 or WPA-CS-03 For indoor air sample: WPA-IA-03	2	2
Background	Upwind of sample locations in open area			Locations around perimeter of sampling area	5 to 8 feet off the ground	LPA-VIBG-01, LPA-VIBG-02, WPA-VIBG-03	4	4
Field duplicate	As close as possible, in space and time, to the original sample			1 outdoor location 1 sub-slab 1 indoor	Same as original sample	Same as original with "D" added to the ID, for example LPA or WPA-SS-01D	3	3
Total Vapor Intrusion Samples							**13**	**13**

NOTE:
SIM = Selective ion monitoring

TABLE 4. QUALITY ASSURANCE INDICATOR CRITERIA

Indicator Parameter	Analytical Parameter	QC Sample[a]	Acceptance Criteria for Laboratory Analysis
Accuracy (percent recovery)	VOCs, EDB, SVOCs, PAHs, TPH, PCBs (Aroclors), Pesticides, Dioxins/Furans	MS MSD Blanks[b]	50 to 150 percent recovery (MS/MSD) Less than CRQL (blanks)
	TAL Metals, Mercury, Hexavalent Chromium, Cyanide, AVS-SEM	MS LCS Reference samples Blanks[a]	75 to 125 percent recovery (MS) 80 to 120 percent recovery (LCS) Limits per supplier (reference sample) Less than CRDL (blanks)
Precision (RPD)	VOCs, EDB, SVOCs, PAHs, TPH, PCBs (Aroclors), Pesticides, Dioxins/Furans	MS MSD Field duplicates	30 percent RPD (MS/MSD) 50 percent RPD (field duplicates)
	Background PAHs and Dioxins/Furans via ICS	Field replicates	30 percent RPD (field replicates)
	TAL Metals, Mercury, Hexavalent Chromium, Cyanide, AVS-SEM, Asbestos, General Chemistry Parameters	MS MSD or MD Field duplicates Laboratory duplicates	20 percent RPD (MS, MSD, MD aqueous) 35 percent RPD (MS, MSD, MD solid) 50 percent RPD (field duplicates) 25 percent (laboratory duplicates)
	Background TAL Metals via ICS	Field replicates	30 percent RPD (field replicates)
Sensitivity (quantitation limits)	Analytical tests	MS MD or MSD Field duplicates Laboratory duplicates	Not applicable
Completeness	The objective for data completeness is 90 percent.		
Representativeness	The sampling network and analytical methods for this site are designed to provide data that are representative of site conditions.		
Comparability	The use of standard published sampling and analytical methods, and the use of QC samples, will ensure data of known quality. These data can be compared to other data of known quality.		

NOTES:

[a] Not all listed QC samples apply to all analytical parameters. QC samples are analytical method specific.

[b] May include method blanks, reagent blanks, instrument blanks, calibration blanks, trip blanks and field blanks.

AVS = Acid-volatile sulfide
CRDL = Contract-required Detection Limit
CRQL = Contract-required Quantitation Limit
EDB = Ethylene bromide
ICS = Incremental Composite Sampling
LCS = Laboratory control sample
MD = Matrix duplicate
MS = Matrix spike
MSD = Matrix spike duplicate
PAH = Polycyclic aromatic hydrocarbon
PCB = Polychlorinated biphenyl
QC = Quality control
RPD = Relative percent difference
SVOC = Semivolatile organic compound
SEM = Simultaneously-extracted metal
TAL = Target Analyte List
TPH = Total petroleum hydrocarbons
VOC = Volatile organic compound

TABLE 12. PARAMETERS, METHODS, REQUIRED VOLUME, CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

Parameter	Method	Volume and Container [1]	Preservatives	Holding Time [2]
Air Samples				
VOCs	EPA TO-15 SIM	One 6-liter evacuated summa canister	None	30 days
Aqueous Samples				
Alkalinity	Standard Method 2320 B	One 250-milliliter HDPE bottle	Store at <6°C (4+2°C)	7 days
Cyanide	CLP ISM02.3	One 1-liter HDPE bottle	NaOH to pH >12; Store at <6°C (4+2°C)	14 days
Dioxins and Furans	CLP HRSM01.2	Two 1-liter amber glass bottles	Store at <6°C (4+2°C)	360 days
Hardness	EPA Method 130.2	One 100-milliliter HDPE bottle	HNO_3 to pH ≤ 2; Store at <6°C (4+2°C)	6 months
Hexavalent Chromium	SW-846 Method 7199 or Standard Method 218.6	One 125-milliliter HDPE bottle	Store at <6°C (4+2°C)	24 hours
Metals (including Hg)	CLP ISM02.3 (ICS/AES and ICS/MS)	One to two 1-liter HDPE bottles	HNO_3 to pH ≤ 2; Store at <6°C (4+2°C)	180 days (28 days for Hg)
PCBs (Aroclors)	CLP SOM02.3	Two 1-liter amber glass bottles	Store at <6°C (4+2°C)	7 days
Pesticides	CLP SOM02.3	Two 1-liter amber glass bottles	Store at <6°C (4+2°C)	7 days
SVOC SIM (PAHs)	CLP SOM02.3	Four 1-liter amber glass bottles	Store at <6°C (4+2°C)	7 days
SVOCs	CLP SOM02.3	Two 1-liter amber glass bottles	Store at <6°C (4+2°C)	7 days
Total Dissolved Solids	EPA Method 160.1	One 1-liter HDPE bottle	Store at <6°C (4+2°C)	7 days
Total Organic Carbon	Standard Method 5310	One 250-milliliter glass bottle	H_2SO_4 to pH <2; Store at <6°C (4+2°C)	28 days
Total Suspended Sediment	ASTM Method D 3977-97	One 200-milliliter HDPE bottle	Store at <6°C (4+2°C)	7 days
VOCs	CLP SOM02.3	Three 40-milliliter amber glass VOA vials (filled to capacity with no headspace)	HCL to pH <2; Store at <6°C (4+2°C)	14 days
Soil and Sediment Samples				
Asbestos	CARB Method 435	One 16-ounce glass jar	None	Unspecified
AVS/SEM	EPA 821/R-91-100 SW-846 Method 6010C/9034	One 8-ounce amber glass jar (filled to capacity)	Store at <6°C (4+2°C)	14 days
Cyanide	CLP ISM02.3	One 8-ounce glass jar with Teflon™-lined cap	Store at <6°C (4+2°C)	14 days
Dioxins and Furans	CLP HRSM01.2	One 8-ounce amber glass jar with Teflon™-lined cap	Store at <6°C (4+2°C)	360 days
Grain Size	ASTM Method D422	1-gallon plastic bag	None	Unspecified
Hexavalent Chromium	SW-846 Methods 3060 and 7199	One 8-ounce glass jar with Teflon™-lined cap	Store at <6°C (4+2°C)	30 days
Metals (including Hg)	CLP ISM02.3 (ICP/AES and ICP/MS)	One to two 8-ounce glass jars with TeflonTM-lined caps	Store at <6°C (4+2°C)	180 days (28 days for Hg)
PCBs (Aroclors)	CLP SOM02.3	One 8-ounce amber glass jar with Teflon™-lined cap	Store at <6°C (4+2°C)	14 days
Pesticides	CLP SOM02.3	One 8-ounce amber glass jar with Teflon™-lined cap	Store at <6°C (4+2°C)	14 days
pH	SW9045D	One 8-ounce glass jar with Teflon™-lined cap	Store at <6°C	Analyze immediately
SVOC SIM (PAHs)	CLP SOM02.3	One 8-ounce amber glass jar with Teflon™-lined cap	Store at <6°C (4+2°C)	14 days
SVOCs	CLP SOM02.3	One 8-ounce amber glass jar with Teflon™-lined cap	Store at <6°C (4+2°C)	14 days
Total Organic Carbon	Walkley- Black	One 8-ounce amber glass jar with Teflon™-lined cap	Store at <6°C (4+2°C)	28 days
VOCs	CLP SOM02.3 SW-846 Method 5035 or 5035A (VOC sample preparation)	Three 5-gram coring tool devices (e.g., EnCore) samplers and one 4-ounce glass jar	Store at <6°C (4+2°C)	48 hours
		Three closed-system pre-weighed 40-milliliter amber glass vials with magnetic stir bar and one 4-ounce glass jar		
LNAPL Sample				
C3-C44 Whole Oil or C8-C40 Full Scan	ASTM Method D3328 or ASTM Method 5739	Two 40-milliliter VOA vials	Unpreserved	Unlimited
Alkyl Leads, EDB, MMT	EPA 8080 Modified (GC/ECD)	Two 40-milliliter VOA vials	Unpreserved	Unlimited
Investigation-derived Waste				
Reactivity	SW-846 Chapter 7	One 4-ounce glass jar with Teflon™-lined cap	Store at <6°C (4+2°C)	72 hours
Corrosivity (pH soil)	SW-846 Method 9045	One 4-ounce glass jar with Teflon™-lined cap	Store at <6°C (4+2°C)	72 hours
Corrosivity (pH liquid)	SW-846 Method 9040	One 500-milliliter glass bottle	Store at <6°C (4+2°C)	72 hours
Corrosivity (steel)	SW-846 Method 1110	One 4-ounce glass jar	Store at <6°C (4+2°C)	7 days
		One 250-milliliter HDPE bottle	Store at <6°C (4+2°C)	
Ignitability (solids)	SW-846 Method 1030	One 4-ounce glass jar	Store at <6°C (4+2°C)	14 days
Ignitability (liquid)	SW-846 Method 1010 or 1020	One 250-milliliter HDPE bottle	Store at <6°C (4+2°C)	14 days
TPH GRO	TX Method 1005	One 4-ounce amber glass jar (filled to capacity)	Store at <6°C (4+2°C)	14 days
TPH DRO and ORO			Store at <6°C (4+2°C)	
TCLP Metals[3]	SW-846 Methods 1311, 3010, 6010, and 7470	100 grams minimum (solid) or 1 liter minimum (liquid) Plastic or glass container	Store at <6°C (4+2°C)	180 days (28 days for Hg)
TCLP SVOCs	SW-846 Methods 1311, 3510, and 8270C	100 grams minimum (solid) or 2 liters minimum (liquid) Glass containers	Store at <6°C (4+2°C)	14 days
TCLP VOCs	SW-846 Methods 1311 and 8260B	50 grams minimum (solid) or 120 milliliters minimum (liquid) Glass containers	Store at <6°C (4+2°C)	14 days

NOTES:

[1] It will be necessary to verify container requirements with the laboratory at the time of scheduling.

[2] Holding time is measured from the time of sample collection to the time of sample extraction and/or analysis.

[3] Arsenic, barium, cadmium, chromium, lead, mercury, silver, and selenium

AES = Atomic emission spectroscopy
ASTM = American Society for Testing and Materials
AVS = Acid volatile sulfide
CARB = California Air Resource Board
CLP = Contract Laboratory Program
DRO = Diesel range organics C_{10} - C_{28}
ECD = Electron capture detector
EDB = Ethylene dibromide
GC = Gas chromatography
GRO = Gasoline range organics C_6 - C_{10}
H_2SO_4 = Sulfuric acid
HCL = Hydrochloric acid
HDPE = High-density polyethylene
Hg = Mercury
HNO_3 = Nitric acid
ICP = Inductively-coupled plasma
MMT = Methylcyclopentadienyl manganese tricarbonyl
MS = Mass spectrometry
NaOH = Sodium hydroxide
ORO = Oil range organics > C_{28}
PAH = Polycyclic aromatic hydrocarbon
PCB = Polychlorinated biphenyl
SEM = Simultaneously extracted metals
SIM = Selective ion monitoring
SVOC = Semivolatile organic compound
TCLP = Toxicity Characteristic Leaching Procedure
TPH = Total petroleum hydrocarbons
VOC = Volatile organic compound

Region 6 Sample Control Center, e-mail to warren.christy@epa.gov or to perez.myra@epa.gov

REQUEST FOR LABORATORY SAMPLE ANALYSES

<table>
<tr><td>Site Name: Wilcox Oil Company</td><td>City/State: Bristow, OK</td><td>CERCLIS #: OK0001010917</td></tr>
<tr><td>GPRA Account #:2015 T 06L 06GGCO00</td><td>Site Spill ID # 06GG</td><td>Type of Investigation/Purpose: RI</td></tr>
<tr><td rowspan="2">EPA SAM, RPM, OSC: Katrina Higgins-Coltrain (RPM)

Mail Code: 6SF-RL

Telephone #: 214-665-8143

Fax #:

(915)
Potential Enforcement Action?

() Yes (X) No</td><td rowspan="2">Analytical Turnaround Time

Region 6 Lab: 35__X__
CLP Organics: 7___ 14__ 21_X__
CLP Inorganics: 7___ 14___ 21 X_

Are preliminary results required?
48 hrs VOA ( ) Yes (X) No
72 hrs Extractables ( ) Yes (X) No
72 hrs Inorganics ( ) Yes (X) No

Requires justification and prior approval.</td><td>Type of Contract: EPA RAC

Contractor:
Patrick Appel
Direct: 972-453-5038
Cell: 817-437-0563
Luis Vega
Direct: 972-459-5040
Cell: 214-280-9031</td></tr>
<tr><td>Shipping Contact: Patrick Appel and Luis Vega

Telephone #: see above

On Site Ph #: see above

E-Mail address:
Patrick Appel pappel@eaest.com
Luis Vega
lvega@eaest.com

Date Sample Control Center Received Request For Sample Analysis:</td></tr>
<tr><td colspan="3">Proposed Sampling Period: week of September 12 - 16, 2016</td></tr>
</table>

Please assure that this request for analytical services has been signed and dated by the appropriate Site Assessment Manager, Remedial Project Manager, or On Scene Coordinator. Please assure that the Sample Control Center has a copy of all relevant Quality Assurance Project Plans (QAPPs) and Sampling and Analysis Plans (SAPs).

Is the QAPP, QASP, SAP, O&M Plan, GWMP,DAW, or other relevant plan being submitted with this Request For Sample Analyses? QAPP was previously submitted **6/30/16**
If no, please explain (expected date of submission etc.): **Submitted 6/30/16**

Signature of **EPA Site Assessment Manager (SAM), Remedial Project Manager (RPM), or On Scene Coordinator (OSC)** to signify approval of this analytical service request.
Signature: _____ Date: _____

To most efficiently obtain laboratory capability for your request, please address the following considerations. Incomplete or erroneous information may result in a delay in the processing of your request.

1. General description of analytical services requested: (QA/R5 - Element B1)

Matrix	Analysis	Number of Samples (without QC) high/low conc	Field QC Samples	
			How many?	Type?
Soil (refer to attached Table 6) Estimate 10 location per day with 4 samples per location over one 5-day week	Volatiles			Trip blank Duplicate Matrix spike Equipment Blank
	Semivolatiles	1	2 1 1	Duplicate Matrix spike Equipment Blank
	PAHs	1	2 1 1	Duplicate Matrix spike Equipment Blank
	Metals including mercury	1	2 1 1	Duplicate Matrix spike Equipment Blank
	Cyanide			Duplicate Matrix spike Equipment Blank
	Dioxins/furans	1	2 1 1	Duplicate Matrix spike Equipment Blank
	Pesticides			Duplicate Matrix spike Equipment Blank
	PCB			Duplicate Matrix spike Equipment Blank
Water (refer to attached Table 8)	Volatiles (including EDB) Trace Water	13	1 2 1	Trip blank Duplicate Matrix Spike
	Volatiles (including EDB) Low Water			Trip blank Duplicate Matrix Spike
	Semivolatiles Low Water	13	2 1	Duplicate Matrix Spike
	PAHs Low Water by SIM	13	2 1	Duplicate Matrix Spike
	Hexavalent Chromium	13	2 1	Duplicate Matrix spike
	Metals including mercury	13	2 1	Duplicate Matrix spike
	Cyanide	13	2 1	Duplicate Matrix spike
Air (refer to attached table 9)	Volatiles	10	3	Duplicate
	Semivolatiles (naphthalene and 1,4-dioxane)	10	3	Duplicate

Additional description (areas where samples are being collected etc.):

2. Analytical protocol required (analytical method & method number, extraction or digestion method & method number, CLP SOW reference, for each matrix if required, etc.): (QA/R5 - Element B4)

Current CLP methods (04/06/16) are: Organics by SOM02.3 Inorganics by ISM02.3

Refer to attached Table 12 and excel sheets.

Matrix	Analysis	Methods
Soil		
	Semivolatiles	SOM02.3 (Low Soil)
	PAHs	SOM02.3 (Low Soil by SIM)
	Metals including mercury	ISM02.3/ICP-MS (with ICP-AES for salts only)
	Dioxins/Furans	CLP HRSM01.2
Water	Volatiles	SOM02.3 Trace Water
	Semivolatiles	SOM02.3 (Low Water)
	PAHs	SOM02.3 (Low Water by SIM)
	Metals, including mercury	ISM02.3/ICP-MS (with ICP-AES for salts only)
	Cyanide	ISM02.3
	Hexavalent Chromium	SW-846 Method 7199 or Standard method 218.7
Air	Volatiles Naphthalene 1,4-Dioxane	EPA TO-15 SIM

Additional Information:
Complete the following information if Method 5035 for VOA soils has been requested:

	# of low conc. soils	# of medium conc. soils		Type of Vials	# of low conc. soils	# of medium conc. soils

3. CLP Modified Analysis Clause - The latest Statement of Works (SOWs), includes a modified analysis clause. The modified analysis allows the regions to request minor changes to current SOW analytical methods in order to meet specific field site requirements. The changes are limited in scope and must be approved by the EPA CLP Program Manager and Contracting Officer before implementation. Information must be submitted **three weeks** prior to the sampling event. The information the client must submit three weeks prior to the sampling event are; Lab Request Form and the approved sampling plan/QAPP.

4. Analytical results required (specify laboratory documentation and reporting requirements, reporting

units, format requirements, etc.): (QA/R5 - Elements A6 and B4)

Standard CLP and/or EPA Region 6 Houston Lab deliverable

5. Data requirements (reporting limits; per analyte per matrix; reporting units; applicable reference levels, etc.): (QA/R5 - Elements A7, B1, and B4) (Attach extra pages if necessary) For CLP capabilities - http://www.epa.gov/superfund/programs/clp/facts.htm. For Region 6 Laboratory capabilities - http://www.epa.gov/earth1r6/6lab/r6lab.htm

Note: Samples submitted to the CLP for analysis must be low or medium concentration, single phase, homogenous (not oily), soil, sediment, or water. Also, samples with matrix related problems (oily material, high concentration of compounds, etc.) and/or high moisture content will raise the method CRQL's.

a. Compounds/chemicals of concern (Action levels etc.) – **Required information – List the compounds/analytes driving the investigation and the action level required to meet DQO's.**

Parameters	Action Levels / Detection Limits	
	water (µg/L)	soil/sediment (ug/kg)
Please see attached excel table for ground water and soil.		

The excel tables provide the volatile, semivolatile, PCB, Pesticide, Dioxin, and metals parameters that are of highest interest for the site. The Project screening level is the requested Action Level/Detection limit for this project. Tab 1 is for ground water, Tab 2 is for air, and Tab 3 is for soil.

6. QC Requirements (PE samples & frequency, spikes, duplicates, blanks, & frequency)

QC Type	Frequency	QC Limits
Trip Blank	1 per cooler	See attached Tables 12 and 4.
Duplicate	1 per 10	
Matrix Spike	1 per 20	

Region 6 Sample Control Center, e-mail to warren.christy@epa.gov or to perez.myra@epa.gov

REQUEST FOR LABORATORY SAMPLE ANALYSES

<table>
<tr><td>Site Name: Wilcox Oil Company</td><td>City/State: Bristow, OK</td><td>CERCLIS #: OK0001010917</td></tr>
<tr><td>GPRA Account #:2015 T 06L 06GGCO00</td><td>Site Spill ID # 06GG</td><td>Type of Investigation/Purpose: RI</td></tr>
<tr><td rowspan="3">EPA SAM, RPM, OSC: Katrina Higgins-Coltrain (RPM)

Mail Code: 6SF-RL

Telephone #: 214-665-8143

Fax #:

(915)
Potential Enforcement Action?

() Yes (X) No</td><td rowspan="3">Analytical Turnaround Time

Region 6 Lab: 35__X__
CLP Organics: 7___ 14__ 21_X__
CLP Inorganics: 7___ 14___ 21 X_

Are preliminary results required?
48 hrs VOA ( ) Yes (X) No
72 hrs Extractables ( ) Yes (X) No
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<tr><td>E-Mail address:
Patrick Appel pappel@eaest.com
Luis Vega
lvega@eaest.com

Date Sample Control Center Received Request For Sample Analysis:</td></tr>
<tr><td colspan="3">Proposed Sampling Period: week of September 19 - 23, 2016</td></tr>
</table>

Please assure that this request for analytical services has been signed and dated by the appropriate Site Assessment Manager, Remedial Project Manager, or On Scene Coordinator. Please assure that the Sample Control Center has a copy of all relevant Quality Assurance Project Plans (QAPPs) and Sampling and Analysis Plans (SAPs).

Is the QAPP, QASP, SAP, O&M Plan, GWMP,DAW, or other relevant plan being submitted with this Request For Sample Analyses? QAPP was previously submitted **6/30/16**
If no, please explain (expected date of submission etc.): **Submitted 6/30/16**

Signature of **EPA Site Assessment Manager (SAM), Remedial Project Manager (RPM), or On Scene Coordinator (OSC)** to signify approval of this analytical service request.
Signature: _____ Date: _____

To most efficiently obtain laboratory capability for your request, please address the following considerations. Incomplete or erroneous information may result in a delay in the processing of your request.

1. General description of analytical services requested: (QA/R5 - Element B1)

Matrix	Analysis	Number of Samples (without QC) high/low conc	Field QC Samples	
			How many?	Type?
Soil (refer to attached Table 6) Estimate 10 location per day with 4 samples per location over one 5-day week	Volatiles	205	5 20 10 10	Trip blank Duplicate Matrix spike Equipment Blank
	Semivolatiles	205	20 10 10	Duplicate Matrix spike Equipment Blank
	PAHs	205	20 10 10	Duplicate Matrix spike Equipment Blank
	Metals including mercury	205	20 10 10	Duplicate Matrix spike Equipment Blank
	Cyanide	205	20 10 10	Duplicate Matrix spike Equipment Blank
	Dioxins/furans	10	1 1 1	Duplicate Matrix spike Equipment Blank
	Pesticides	10	1 1 1	Duplicate Matrix spike Equipment Blank
	PCB	10	1 1 1	Duplicate Matrix spike Equipment Blank
Water (refer to attached Table 8)	Volatiles (including EDB) Trace Water	1	1 1 1	Trip blank Duplicate Matrix Spike
	Volatiles (including EDB) Low Water	1	1 1 1	Trip blank Duplicate Matrix Spike
	Semivolatiles Low Water	1	1 1	Duplicate Matrix Spike
	PAHs Low Water by SIM	1	1 1	Duplicate Matrix Spike
	Hexavalent Chromium	1	1 1	Duplicate Matrix spike
	Metals including mercury	1	1 1	Duplicate Matrix spike
	Cyanide	1	2 1	Duplicate Matrix spike
				Duplicate
				Duplicate

Additional description (areas where samples are being collected etc.):

2. Analytical protocol required (analytical method & method number, extraction or digestion method & method number, CLP SOW reference, for each matrix if required, etc.): (QA/R5 - Element B4)

Current CLP methods (04/06/16) are: Organics by SOM02.3 Inorganics by ISM02.3

Refer to attached Table 12 and excel sheets.

Matrix	Analysis	Methods
Soil	Volatiles	5035 + SOM02.3 (Low Soil)
	Semivolatiles	SOM02.3 (Low Soil)
	PAHs	SOM02.3 (Low Soil by SIM)
	Metals including mercury	ISM02.3/ICP-MS (with ICP-AES for salts only)
	Cyanide	ISM02.3
	Dioxins/Furans	CLP HRSM01.2
	Pesticides	SOM02.3
	PCB	SOM02.3
Water	Volatiles	SOM02.3 Trace Water
	Volatiles	SOM02.3 (Low Water)
	Semivolatiles	SOM02.3 (Low Water)
	PAHs	SOM02.3 (Low Water by SIM)
	Metals, including mercury	ISM02.3/ICP-MS (with ICP-AES for salts only)
	Cyanide	ISM02.3
	Hexavalent Chromium	SW-846 Method 7199 or Standard method 218.7

Additional Information:
Complete the following information if Method 5035 for VOA soils has been requested:

	# of low conc. soils	# of medium conc. soils		Type of Vials	# of low conc. soils	# of medium conc. soils
Pre-Weighed Vials with stir bar (Closed System Vials)	100	100				

3. CLP Modified Analysis Clause - The latest Statement of Works (SOWs), includes a modified analysis clause. The modified analysis allows the regions to request minor changes to current SOW analytical methods in order to meet specific field site requirements. The changes are limited in scope and must be approved by the EPA CLP Program Manager and Contracting Officer before implementation. Information must be submitted **three weeks** prior to the sampling event. The information the client must submit three weeks prior to the sampling event are; Lab Request Form and the approved sampling plan/QAPP.

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Note: Samples submitted to the CLP for analysis must be low or medium concentration, single phase, homogenous (not oily), soil, sediment, or water. Also, samples with matrix related problems (oily material, high concentration of compounds, etc.) and/or high moisture content will raise the method CRQL's.

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